R S *Corpora æqualia, vel* R *corpus majus*, S *corpus minus.*
a *Centrum Gravitatis ſive anſa Libræ.* Z *ſumma velocitatum utriuſque corporis.*

$$\left.\begin{matrix} Re \\ Se \end{matrix}\right\} \textit{veloc. corp.} \left\{\begin{matrix} R \\ S \end{matrix}\right\} \textit{ante impulſum data} \Big) \textit{ vel } \Big(\left\{\begin{matrix} So \\ Ro \end{matrix}\right\} \textit{veloc. corp.} \left\{\begin{matrix} S \\ R \end{matrix}\right\} \textit{ante impulſ data.}$$

$$\left.\begin{matrix} OR \\ OS \end{matrix}\right\} \textit{veloc. corp.} \left\{\begin{matrix} R \\ S \end{matrix}\right\} \textit{poſt impulſ. quæſita} \Big) \Big(\left\{\begin{matrix} eS \\ eR \end{matrix}\right\} \textit{veloc. corp.} \left\{\begin{matrix} S \\ R \end{matrix}\right\} \textit{poſt impulſ. quæſita.}$$

[*Lege ſyllabas* (*quamvis disjunctas*) R e S e o R o S *vel* R o S o e S e R *in Linea cujuſlibet Caſus, & harum quæ ſcribitur in* Schemate *more* Hebraico, *ea indicat motum contrarium motui, quem notat cujuſvis ſyllabæ ſcriptio* Latina: *Syllaba conjuncta quietem Corporis denotat.*]

Calculus
$$\begin{matrix} R+S:S::Z:Ra \\ R+S:R::Z:Sa \end{matrix} \Big| \begin{matrix} Re - 2Ra = oR \\ 2Sa + Se = oS \end{matrix} \Big| \begin{matrix} So - 2Sa = eS. \\ 2Ra + Ro = eR. \end{matrix}$$

Natura obſervat regulas Additionis & Subductionis Specioſæ.

An Account of two Books.

I. HISTORIA CÆLESTIS; Ex Libris & Commentariis M. Stis. Obſervationum Vicennalium TYCHONIS BRAHE, *Dani*, Auguſtæ Vindelic. *An.* 1666. *in Folio.*

THeſe Obſervations of the Noble *Tycho*, as they were procured and preſerv'd by thoſe Three Mighty Emperours, RUDOLPH. II. FERDINAND. II. and III; ſo they were lately by the Command of his Imperial Majeſty LEOPOLD made publick. They are uſher'd in by a *Liber Prologomenos*, compendiouſly repreſenting the Obſervations made from the time of the very Infancy of Aſtronomy unto that of its Reſtauration by the Illuſtrious *Tycho*; and reduced into 7. Claſſes, *viz.*

1. The *Babylonian* Obſervations; from *A.* before Chriſt 721. unto *A.* 432.

2. The *Grecian*; from *A.* before Chriſt 432. unto the beginning of the Vulgar Chriſtian Account.

3. The *Alexandrian*; from *A. Chriſti* 1. until *A.* 827.

4. The *Syro-Perſian*; from *A. C.* 827. unto 1457.

5. The *Norimbergian*; from *A. C.* 1457. unto 1509.

6. The

6. The *Boruſſian*; from *A. C.* 1509. to 1529.
7. *Mixt* Obſervations; from *A. C.* 1529. to 1582.

In which year (1582) do begin the Obſervations of *Tycho* (as is affirm'd in this *Edition*) contain'd in 20 Books, and made in as many years, ending *An. Chr.* 1601, which was the end of *Tycho*'s Life: Of which time yet there being wanting one year (*viz.* 1593) of the *Brahean* Obſervations, *that* is ſupply'd by the *Hoſſian*; and by a *Catalogue* of the *Fixt Stars*, made and digeſted by the Authority and Care of that Renowned Prince for Learning and Magnanimity, *William*, Landgrave of *Heſſen*, and by the Labours of *Rhotmannus* and *Birgius*.

To all theſe is added a Continuation of ſuch Aſtronomical Obſervations as were made from the time of *Tycho*'s death unto *An.* 1635, by *Maſtlinus* and *Schickardus*.

Having given the Reader this ſhort Account, I find my ſelf obliged to give him notice withall of a Paper publiſh'd this year, entituled *Specimen Recognitionis* nuper editarum *Obſervationum Aſtronomicarum*, Nob. Viri *Tychonis Brahe*, printed at *Copenhagen* in 4°: wherein are remark'd by *Eraſmius Bartolinus* the more conſiderable Errors in the Obſervations of *An.* 1582. In this Edition of the *Hiſtor. Cæleſtis*, by comparing it with the *Original*, in the power of the preſent King of *Denmark*. In which Paper hopes alſo are given of a more correct Edition, and that of the *Original* it ſelf; together with the Obſervations both from *An.* 1563. to *An.* 1582. and thoſe of *An.* 1593; all wanting in this Edition of *Ausburgh*.

II. R. P. ANDREÆ TACQUET *e Soc. J. Opera Mathematica; with many Schematiſmes thereto belonging.* Antwerp. 1669. *in Fol.*

THeſe Works contain,

1. Of *Aſtronomy* 8 Books, wherein the Author hath explain'd the whole Doctrine of that Science in ſuch a gradual Scientifick Order, that now (as himſelf in his own Preface intimates) a Student without the Aid of a Maſter may learn the whole by his own Study, which was formerly not eaſie to attain with the beſt Inſtructions.

It may be, the Inquiſitive *Reader* will be deſirous to know, what *Syſteme of the World* it is, this Author inſiſts on; concerning which we ſhall give you his own words, *p.* 326.

Hanc controverſiam (*ſc. de* Motu Terræ) *Joh. B. Ricciolus* Almag. l. 9. *ea tum eruditione tum copia proſecutus eſt, ut facile omnes in hoc negotio ſuperaverit. Primo,* Copernicanorum *pro* Motu Terræ *Argumenta* 49. *deducit ac deſtruit; pari deinde cura, quæ contra* Terræ Motum *afferri ſolent & poſſunt* Argumenta, *vid.* 77. *recenſet. Mihi vero, cum nihil hactenus in utramvis partem adductum videam, quod Probabilitatis metam excedat, his immorari non eſt animus. Unum eſt tamen ex omnibus contra* Terræ Motum

pſius Riccioli *Argumentum a* Gravium deſcenſu *petitum, cui vim ipſe Demonſtrationis ineſſe putat; quod examinare hoc loco accuratius operæ pretium judicavi.*

This with other Arguments he refutes; but declareth *p.* 330. That, though he knows no Argument, demonſtrating the *Reſt* of the *Earth* and *Motion* of the *Sun*; yet the Authority of Holy Writ, now ſeconded by that of the Sacred Congregation of the Cardinals, put it out of doubt.

Concerning the Doctrine of *Motion*, the Author ſaith thus, *p.* 15. *Motuum* Compoſitorum *Contemplatio digna ſane eſt, quæ a Geometris excolatur. De ſolo motu* Volutionis *conſcripſi Tractatum integrum, quem cum libris* Cylindricorum *&* Annularium *in lucem edidi. De Motu* Projectorum, *qui & ipſe* Compoſitus *eſt, ſubtiliſſimi exſtant Libri* Galilæi *&* Torricellii: *Et præter hæc, alia ſuperſunt innumera, de quibus integra Nova Scientia condi poſſit.* (Which is accordingly done by the Excellent Dr. *Wallis* in his Book now in the Preſs.)

For the eaſe of Calculating an *Eclipſe* of the *Sun*, we find, that this Author *p.* 177. determines, in what part of the Earth ſuch an Eclipſe ſhall appear, without the Aid of *Parallax*, and that the Sun's *Parallax*, as to the determination of Celeſtial Motions, may be ſafely neglected. And *p.* 40. he rejects the *Senſible Inequality* of the *Solar* or *Tropical* years; as alſo *p.* 60. the *Irregularity* of the *Obliquity* of the *Ecliptick*, of the *Proceſſion* of the *Equinoxes and Excentricity*. *Pag.* 127. he ſolves that Doubt of *Ricciolus*, That it cannot be exactly and evidently known by any Natural Obſervations made of the Moon or any Star, what the *Parallax* is, without the fore-knowledge of the *Parallax*, or diſtance from the Earth. And *p.* 193. avoids theſe Inconveniences in aſſigning the Declinations of the Fixed Stars. *P.* 338. this Author aſſerts, that the *Comets* and *New Stars*, that have appear'd ſince 1572, have been far *above* the Moon; and that *Ricciolus* about this Controverſie ſeem'd too favourably inclined to *Claramontius*, aſſerting the contrary.

Concerning the Cauſe of the *Secondary* light of the Moon before and after the New, to wit, the obſcure part of her appearing like kindled glittering Aſhes, our Author aſſigns it to be the Suns rays reflected from the bright Hemiſphere of the Earth to the darker portion of the Moon, and thence again directly reflected to the Earth deſtitute of the Sun's light. This *Phenomenon* he ſaith, is learnedly explain'd in *Philoſ. Optica Nic. Zucchii* from *p.* 247 to *p.* 260.

The Author hath not framed nor annex'd any *Tables* to his Book, although he abundantly ſhews, How they may be computed: referring his Reader to thoſe of *Tycho*, *Reinholdus*, *Longomontanus*, *Kepler*, *Lanſberg*, *Wendelinus*, *Bullialdus*, *Petavius*, *Reinerius*, *Ricciolus*; to which may be added thoſe of *Duret*, *Rilly*, *Street* (which laſt fixes the *Nodes* and *Aphelions*) and *Wings*, now in the Preſs.

To the end of theſe 8 Books are annext *Propertions* for the 28 Caſes of

Spherical

Spherical Trigonometry. Thoſe that deſire to be farther ſatisfied, may read *Trigonometria Britannica* of *Gellibrand* and *Newton*, the *Idea Trigonometriæ* by the Lord Biſhop of *Sarum*, Dr. *Seth Ward*; and alſo *Bonavent. Cavalerii* Trigonometria, and his *Directorium Univerſale Uranometricum*, but eſpecially his *Compendio dille Regole Trigonometriche & Centuria di Problemi.*

2. Of *Practical Geometry* 3 Books.

In the *Firſt* the Author handleth

The Conſtruction of the Tables of *Sines*, *Tangents*, and *Secants*.

The Reſolution of Right-lined Triangles.

The Menſuration of the diſtance of Objects, as well unacceſſible as acceſſible.

The Heights of Mountains, Towers, Clouds, Rainbowes; the Depths of Wells and Vallies. He concludes the perpendicular height of the burning Mountain *Ætna* to exceed 5 *Bononian* Miles; of Mount *Caucaſus* beyond the *Caſpian*-Sea to be 51. Mount *Athos* of *Greece* 28. *Caſius* of *Syria* 20. the *Alpes* of *Italy* and *Pic* of *Tenariffe* 10 Miles. The Circumference of the Earth, the Diſtances of the Sun, Moon, and Earth.

In the *ſecond* Book, he handles the Dimenſion of Plain Surfaces, either Regular or Irregular, and takes the *Ichnography* or Deſcription in Paper, of any Figure given of the ſurface of the Earth: Aſſerts the Poſſibility of the *Quadrature* of the *Circle*; and handles the Transformation of Plain Figures, to wit, their Addition, Subſtraction, Augmentation, Diminution, Compariſon; further the dividing of a Plain Triangle, in a given Reaſon by a line paſſing through a Point any where aſſigned: This he doth largely in 16 *Propoſitions*, becauſe upon it chiefly depends the Diviſion of other Right-lined Figures; and becauſe he found divers Determinations wanting, when the point is given within. Thoſe that are deſirous to ſee this *Analytically* done, may find it in *Herigon* with a Conſtruction thereof; as alſo a *Geometrick* Conſtruction thereof in *Van Schootens* Miſcellanea; and another moſt excellent Conſtruction at the end of *Van Ceulen* de *Circulo & Adſcriptis.*

Afterwards our Author proceeds to the dividing of other Figures, in a given Reaſon, or by parallel lines, and ſheweth how to apply the whole to *Practice* in the Field.

In the *third* Book the Author firſt meaſureth ſuch Solids as are contained under a Plain Surface. Secondly, ſuch as are contained under a Curved Surface. Thirdly, He meaſureth the *Mundane* Bodies, as the *Surface* of the *whole Earth*; where he is pleaſed to conclude, that at the Day of Judgement, a leſs portion of it then *England*, will ſerve to hold all its Inhabitants, and their Infants, that ever have been, or in likelihood may be hereafter, till then, ſuppoſing the World ſhould laſt 10000 years. He meaſureth alſo the Solidity of the Earth, and Ocean; the Magnitude of the Sun, Moon,

and Earth. The Increaſe, and Diminution, the Transformation and Compariſon of divers Solids, and the Menſuration of divers of their Surfaces.

3. *Of* Opticks 3 *Books.*

In the *firſt*, he handleth the *ſimple* and *direct* Appearances of Objects meaning ſuch appearances as are not liable to Reflection or Refraction; and herein he ſaith, that paſſing by ſlight matters, he onely treats of ſuch as are either new, or of the better eſteem; ſuch as are the Properties of the ſight, the manner of its perceiving a Diſtance; and the Place of the Eye being aſſigned, to find that Height, in which a greater Length or Breadth ſhall appear equall to a leſſer Length or Breadth, or any aſſigned Length or Breath ſhall appear in a given Proportion. He likewiſe finds the Portion of a *Cone* or *Cylinder*, ſeen according to the Magnitude of the Figure, and Poſition of the Eye, and explains the Moons *Phaſes*.

In the 2d. He handles the Theory and Practice of the *Perſpective* or *Scenographick Projection*, or Tranſcription of a given Magnitude into a Plain, which cuts the Optick *Pyramid*; wherein he explains the Direct appearance, and the Monſtrous deformation of an Object, which at a certain place ſhall appear beautiful.

In the 3d. He treats of the *Aſtronomick Projections* of the *Spheare*, and thence derives the triple *Aſtrolabe*, and ſhews their uſes, and the Conveniences or Inconveniences of each Projection: *viz.* the Projection on the *Plain* of the *Æquator*, the Eye being in one of the *Poles*; or on the *Plain* of the *Colure* of the *Solſtices*, the Eye being in one of the *Æquinoctial Points*; and the *Orthographick* Projection, by Perpendiculars falling from the reſpective Points of the Circles of the Spheare, on the Projecting Plain: Such a Projection, if the Plain be the Meridian, *Ptolomy* called the *Analemma.*

If the Eye be in the *Zenith* or *Nadir* projecting on the *Plain* of the *Horizon*, the Author ſheweth, that the Projection will be the ſame, as if the Eye were in one of the *Poles* projecting on the *Plain* of the *Æquator*, onely the names of Circles are changed.

Pag. 205. *Nam Circulus qui in illa referebat Æquatorem, in hac Horizontem repræſentat; & Projecturæ Tropicorum reliquorumq; Æquatori parallelorum in illa, in hac ſunt Projecturæ parallelorum* Horizonti *ſeu* Almicantarath: *rurſum qui in illa ſunt Projecturæ* Horizontis, Almicantarath *&* Verticalium, *in hac projecturæ erunt* Æquatoris *&* Parallelorum *ejus, ac* Meridianorum. *Poſtremo rectæ lineæ, quæ per Centrum Projectionis ductæ, erant projecturæ* Meridianorum *in illa, in hac erant* Verticalium Projecturæ; *quare qui illius Projectionis modum probe intellexerit, hanc quoq; nullo negotio perficiet.*

If this had been well observed, there had been no need of Controverting, Whether the *Horizontall* Projection had been a *New* Invention: It is as Ancient as *Ptolomy*, and all the 4 *Quadrants* of several contrivances published by Mr. *John Collins**, are derived from the *Western* side, or the continuance thereof, admitting but a meer Mutation of the Names of Circles, and a projecting of more Parallels.

* *These* Quadrants, *printed, may very conveniently be pasted on* Copper-Plates, *and varnisht; which done, they will be not only very cheap and portable* (*to be had at* John Marks *at the Sign of the* Golden Ball *near* Somerset-House) *but also serviceable enough, being preserv'd by the Varnish from the accidental injuries of Ink and Dirt; and for these very causes made publick, serving for an Example to introduce the like way for other Mathematical Instruments.*

4. Of *Catoptricks* 3 Books; in the *First* of *which* the Author treats of *Catoptricks* or *Reflection*.

In the *Second*, of the affections of *Plain* Glasses simply, or of many such placed either in a Parallel or Inclined Position to each other.

In the *Third*, of *Curved Glasses*, and therein first the chief affections of *Convex* Sphærick Glasses; afterwards of *Concave* Sphærick Glasses: lastly of *Burning* Glasses of several kinds.

The death of the Author prevented him from Writing of the *Dioptricks*, which was very far advanced by *Des Chartes*, and hath been further promoted since by *De Beaune*, *Honorato Fabri*, *Manzini*, and in the Century of Optick Problems of *Eschinardus*; and we may hope that ere long the learned Mr. *Barrow* will enrich the World with his Labours of this and other kinds; also Mr. *James Gregorie*, the Author of *Optica Promota*, hath a Treatise of this Subject in good forwardness for the Press.

5. Follows the Authors Treatise of *Military Architecture* or *Fortification*; in which he hath collected six several ways of *Regular* Fortification, and hath likewise divers ways for *Irregular* ones, when the Scituation of the place so requires; and intersperseth divers questions, and relates some Transactions in the late eminent Sieges of Christendome.

6. Follow his *Annularia & Cylindrica*; the first 4 Books whereof were first publisht in 1651, and are common enough to be had here; which may make the *Reader* wonder at their being reprinted; especially considering, that though they have deservedly received much applause, yet they have likewise been censur'd for opposing and neglecting other Methods, whereby the Author might have rendred, what he delivers, more universally and briefly. Concerning the first 4 Books, *Aut. Lalovera* in his Book *de Geometr. veterum promota* thus;

Sero venerunt in manus nostras R. P. Tacqueti *lib.* 4. Cylindricorum & Annularium: *Opus censemus absolutissimum, ejusq; Authori, qui primus hac de re suas lucubrationes vulgavit, istam coronam debitam esse agnoscimus.*

And *Stephen. Angeli* in his Treatise *de Infinitis Parabolis, deque Infinitis Solidis, &c.* (printed at *Venice* 1659.) in the *Preface* begins thus;

Cubica-

Publici Juris fecimus elapſo anno 1658. *libellum quendam, cui titulus*, Sexaginta Problemata Geometrica: *In hujus calce Appendiculam adjunximus, in qua occurritur* Mario Bettino, *Cavalerianæ Indiviſibilia veluti Dæmonas paventi. Paucis vero tranſactis diebus a modo dicti Libelli impreſſione, incidimus forte* Venetiis *in opus Aureum* And. Tacquet, CYLINDRICA & ANNULARIA *nuncupatum; in quo cum incideremus in* Schol. *prop.* 12. *l.* 1. *Authorem carpere* Indiviſibilia *invenimus.*

Doluimus vehementer (ſaith Angeli) *Opus tanta eruditione refertum non prius ad manus noſtras perveniſſe; cenſura autem in ipſo contra* Indiviſibilia *pronunciata, parum aut nihil nos turbat: Vetera enim continet & non niſi eorum modica, & imbecilliora, quæ prius ab ipſo* Cavalerio *in Præfat.* Geometriæ Indiviſibilium, *& a* Guldino *in* Centro-baryca *objiciuntur; quibus ſatis ſuperque occurrit ipſe* Cavalerius.

And *Angeli* in the Preface of his Treatiſe *De Infinitorum Spiralium Spatiorum Menſura* (Venetiis 1660.) having occaſion to mention the fruitleſs endeavour of *Guldin* in finding the Center of Gravity of a Spiral Line, and a Right line equal thereto, ſaith thus,

P. Guldinus, *Centrobaryca* (Anno 1635. & 1640. *editæ*) *Author famoſus* (*at* Cavalerianorum Indiviſibilium *contemptor & irriſor, qui dum Indiviſibilibus irriſit, ſeipſum ridiculum præbuit*) *altius omnibus volatum ſumpſit, at conatu irrito, &* Icari *fine, ut ipſemet fatetur.*

But *Guldinus* doth not confeſs himſelf in an error in oppoſing *Cavalier's Geometria Indiviſibilium*, publiſht 1632; but ſaith, he was very aged, of an infirme memory, and that he had not (as we may gather) leiſure to peruſe it throughly, when he had health, nor health when he had leiſure. The Controverſie, and the Reply about it, is exceeding pleaſant, and to be found with other conſiderable Miſcellanies in the *Geometr. Exercitat.* of *Cavalerius* printed at *Bononia* 1647. Which Book if *Tacquet* had ſeen (for he quotes it not) he would probably not have made any ſuch oppoſition.

Angeli doth not only anſwer what is objected by *Tacquet*, but ſhews, what famous Authors he hath on his ſide, who have derived many excellent Inventions from this Method of Indiviſibles, *viz. Beaugrand, Rocca, Magiottus, Van Schoten, Rich. White, Bullialdus, Torricellius*, who calls *Cavalier's* Firſt Book the *Ocean* of *Indiviſibles*, and the *Fountain* of *Inventions.* Of which Doctrine he renders many excellent Examples.

Moreover the ſame *Angeli* in the Preface to his ſaid Tract, *De Infinit. Spiral. Spatiorum Menſura*, hath theſe words:

Pro Indiviſibilibus eſt veritas ipſa, ſtantque illi omnes præclariſſimi Geometræ, quos in Epiſt. ad Lectorem *Operis noſtri* De Infinitis Parabolis *recenſuimus; quibus nuper ultro ſe aſſociavit* Vinc. Viviani l. 1. De Maximis & Minimis, *monito poſt* Prop. 17. *ubi ait, Ut hoc loco, ex adverſo indirectæ Antiquorum viæ per duplicem poſitionem, luce clarius pateat, quantum facilitatis, brevitatis, atque evidentiæ nanciſcatur e nova directaque methodo* (*recte tamen*

tamen cautoque usurpata) *acutissimi* Cavalerii; *per* Indivisibilium *doctrinam nobis amicissimam.*

And *when* thus *carefully* to apply it, of that see *Lalovera*'s *Elementa Tetragonismica Tolosæ* 1651. where *more Archimedeo* he demonstrates the truth of this Method; which Book if *Angeli* had seen, he would certainly have quoted it, and admired the Author

For want of this Method, it was, saith *Angeli*, by way of complaint, of *Tacquet*, that he omitted some Theorems, which by aid thereof he might easily have found out. See him in his Preface to his *Infinite Spirals*; but especially at *Schol.* 3. *Prop.* 15. l. 2.

Si ergo Tacquet *recepisset doctrinam* Cavalerii, *potuisset non solum Cubare portionem Cylindrici Parabolici super quacunque Infinitarum Parabolarum per Basin Parabolæ & Punctum in latere; sed etiam ex iis, quæ in* Exercitat. 4. Cavalerii *tradunt ipse &* Beaugrand, *potuisset Cubare Segmenta portionis cujuscunque* Cylindrici Parabolici *resectæ planis sectioni maximæ parallelis: Imo ex doctrina* Cavalerii *potuisset etiam Cubare*, & *portionem* Cylindrici *super* Hyperbola *per basin Hyperbolæ & Punctum in latere*, & *segmenta hujus portionis resectæ planis sectioni maximæ parallelis* (*suppositâ tamen* Hyperbolæ *Quadratura.*)

Angeli finds afterwards another deservedly famous Man, *viz.* Dr. *John Wallis*, owning and using the Method of *Indivisibles*, and advancing it to admiration in his *Arithmetica Infinitorum*; who in his Book *de Cycloide* at *Oxford* 1659, saith thus, *Pag.* 9.

Supponimus enim (*quod et facile, si opus est, probabitur*) *Planum quodvis tantundem hujusmodi Conversione* (*seu Rotatione*) *producere, quantum est quod fit ex eodem Plano in lineam ipsius Centro gravitatis descriptam ducto; quod & de linea quavis sive rectâ sive curvâ, in eo Plano descripta, pariter intelligendum est: Quod quidem enim ipse olim me primum invenisse putaverim, monitus moxeram, nonnihil apud* Guldinum *existare quod huc spectet. Id autem si animadvertisset* Tacquetus, *dum de* Cylindricis *&* Annularibus *acutum Opus conscripsit, non parum illi fuisset adjumento, multaque quæ illic extant, tum Universaliùs tum contractius forte fuissent edita.*

All which is not recited here, to disparage our Author, but to take off the prejudice, which he may beget in his Readers against the Method of *Indivisibles*, which hath been owned by other famous Men, besides those already recited; *viz.* by *Mengolus*, who from the Excellencies of *this* Method, *Archimed*'s Method, and *Vieta*'s Specious *Algebra*, compos'd his *Geometria Speciosa*; by *Antimo Varby*, *alias* (as 'tis suggested) *Hon. Fabri* in Tract. *De Linea Sinuum & Cycloide*; by *Pascal*, alias *Dettonville*; by *Des Cartes* himself Vol. 3. of Letters, who saith, that by it he squared the *Cycloid*, and lately by the excellent *Slusius*, *&c.* 2. To remove the other prejudice that may be against this Author as defective: for the 5th Book *Cylindricorum* & *Annularium* (now printed with the rest) the *Prefacer* asserts to be first extant in 1659. And because we presume, the rest of these Books are already known and common, and that this hath not formerly been expos'd to sale in *England*; and because also it supplies and compensates those defects, we think fit to acquaint the Reader with the Argument thereof. The Author divides this Fifth Book into six parts:

1. In the first he demonstrates (in 6 *Lemma*'s and 9 *Propositions*) That, if any Plain Surface have a Rotation about its Axis in any Situation whatsoever, and at any distance whatsoever, or none, it produceth a Round Solid equal to an Upright Solid, whose Base is the begetting Figure, and Height is equal to the Circumference described by its Center of Gravity. (*This Universal Rule was invented by* Guldin, *and is the Basis of most of his Doctrine; but he could not demonstrate the same, though 'twas much desired.*)

2. In like manner, If any *Perimeter* have a Rotation about its Axis in any Situation whatsoever, it begets a round Surface, equal to a right Surface, made by the same *Perimeter* as a Base (which may be evolv'd and made a Plain Surface) whose height is the way or circumference described by its Center of Gravity. This by 5 *Lemma*'s and 10 *Propositions.*

These

These being two admirable Universal Rules in Geometry, *the Reader will find the same* (*with many others*) *demonstrated by Dr.* VVallis *in his Treatise* De Calculo Centri Gravitatis, *which together with his other Tracts,* De Motu, Statica, Mechanica, *are now at the Press in* London. *The same Rules are likewise demonstrated in* Geometriæ parte Universali Jacobi Gregorii Scoti, *Patavii* 1668. *Of which a competent number of Copies is expected here.*

The Methods of these Learned Men are different, and good Arguments might be given, that they have not communicated nor seen the Works of each other.

Guldinus, l. 1. c. 12. *shews a Mechanick way to find the Center of Gravity of a Surface or Curv'd Line, by 2 free suspensions, from the points of which, perpendiculars being drawn, do cross each other at the Center of Gravity. This we mention, to keep the Reader from taking the Center of Gravity of a Curv'd Line as such* (*which is intended in this* 2*d Rule*) *to be the same with the Center of Gravity of the Figure thereby terminated in the first Rule.*

3. Considers the Affections of *Round Solids*, begot from a *Parabola*, in 10 *Propositions* from *Numb.* 20. *to* 29. both *inclusive*; whereof the 21 and 23 gives the *Hoof* required by *Angeli*, which was formerly cubed by *Greg. de S. Vincentio*. In the 27th *Prop.* he gives the Proportion of the *Parabolical Conoid* to the *Spindle* made of the same *Parabola* by rotation about its Base, to be, As the *Base* of the *Parabola* is to $\frac{16}{15}$ of the *Axis*; shewing, that *Guldinus* err'd through forgetfulness. In *Prop.* 29. he delivers, that the *Parabola* bears such a proportion to a *Circle* describ'd about the *Base* thereof as a Diameter, As the *Axis* of the *Parabola* doth to that *Circumference* of a Circle, whose *Radius* is equal to the distance of the Center of Gravity of the *Semi-Parabola* from the *Axis*.

4. Contains divers endeavors and manifold new ways towards the obtaining the *Quadrature* of the *Circle* in 12 *Propositions*.

5. Contains 10 Propositions, from 41 to 51; in the 42th whereof he finds a *Sphere* equal to an *Hyperbolical Ring-Solid*; whence divers ways are open'd towards the attaining the *Quadrature* of the *Hyperbola*: And he finds a Sphere equal to a Ring made by the Rotation of a *Segment* of an *Hyperbola*, and of the *Segment* of a *Circle* thereto annexed, described about the Base of the *Hyperbola* as a Chord Line: Then he absolutely cubes certain *Hoofs* cut out of an *Hyperbolical Cylinder*, and thence derives other ways towards the obtaining the *Quadrature* of the *Hyperbola*.

6. Delivers 3 Theorems, shewing the proportion between an *Hyperbola* and a *Circle*: which are conceived to be wholly new.

But these *Theorems* suppose the *Quadrature* of *both Figures* known, *viz. That* of a Circle, in requiring the length of the *Circumference* of a *Circle*, described by the *Center of Gravity* of an *Hyperbola*; which Center cannot be found, without giving the *Quadrature* or *Area* of the *Hyperbola*: which hath been most happily perform'd by *M. Mercator* in his *Logarithmo-Technia* and further advanc'd by Dr. *Wallis* in N. 38. of these *Transactions*; and by *M. Gregorii* also further promoted and otherwise perform'd in his *Exercitationes Geometricæ*, where he shews, the same *Methods* and *Approaches* to be likewise applicable to the *Circle*.

What we have said, being an Account of one of the most considerable Volumes of Mathematicks extant, we hope we may be the better excused for prolixity. This Author formerly publish'd the *Elements* of *Plain* and *Solid* Geometry in 8°, and an *Arithmetick* in 8°, wherein he promised a Treatise of *Algebra*.

Errat. P. 865. l. 24. *r. m* P C; p. 866. l 3. *del. sinistrorsum*; *ibid.* l. 18. *r. Gravitationem*; *ib.* l. 24 .*r. progressivo*; *ib.* l. 29. *r. sit*; p. 867. l. 23. *r. improprie.*

☞ P. 863. Insert immediately before these words [*Lege syllabas, Regula.* Re, Se, faciunt *oR*, *oS*: Ro, So faciunt *eS*, *eR*.

In the *SAVOY*,

Printed by *T. N.* for *John Martyn*, Printer to the *Royal Society*, and are to be sold at the *Bell* a little without *Temple-Bar*, 1668.